WHAT IS CLAIMED IS:

1. A method of reducing phase noise detected using an interferometric system comprising the steps of:

generating a light beam having a frequency that is intentionally varied as a function of time and that includes undesired frequency fluctuations, said undesired frequency fluctuations being phase noise;

directing a first beam portion of said light beam to a reference interferometer, said reference interferometer having known optical characteristics;

directing a second beam portion of said light beam to a test interferometer;

detecting optical outputs for each of said reference and test interferometers;

determining phase information regarding each of said optical outputs; and

for each particular one of said reference and test interferometers, using said phase information that is specific to said particular one and using delay information that is specific to the other of said reference and test interferometers to at least partially cancel said phase noise.

2. The method of claim 1 wherein using said phase information and said delay information includes calculating characteristics of a device under test, where said device under test is connected to said test interferometer.

3. The method of claim 1 wherein using said phase and delay information includes determining for each time (t) in a time series:

an indication of a difference in a phase of said optical output of said test interferometer at said time t and a phase of said optical output of said test interferometer at a time offset from said time t by a known optical delay introduced within said reference interferometer; and

an indication of a difference in a phase of said optical output of said reference interferometer at said time t and a phase of said optical output of said reference interferometer at a time offset from said time t by a time that is representative of a delay introduced within said test interferometer by a device under test (DUT).

4. The method of claim 3 wherein generating said time series includes determining a difference between said indications of said differences for each said time t.

5. The method of claim 4 wherein using said phase and delay information includes determining group delay associated with said DUT, said group delay being determined following said steps of determining said indications of differences.

6. The method of claim 1 wherein generating said light beam includes activating a laser source in a sweep frequency mode.

7. The method of claim 1 wherein said directing steps include coupling said first and second beam portions to reference and test interferometers that define a heterodyne optical network analyzer.

8. An interferometric system comprising:

a source of coherent light configured to vary the frequency of said coherent light within a range, said source being susceptible to irregular frequency variations;

a reference interferometer coupled to said source to receive a reference beam portion of said coherent light, said reference interferometer having a known delay;

a reference detector optically coupled to said reference interferometer to generate a reference output signal representative of light received from said reference interferometer;

a test interferometer coupled to said source to receive a measurement beam portion of said coherent light, said test interferometer being configured for optical coupling to a device under test (DUT) with a delay that is susceptible to variations with said frequency;

a test detector optically coupled to said test interferometer to generate a test output signal representative of light received from said test interferometer; and

a processor configured to at least partially offset effects of said irregular frequency variations in an analysis of said DUT, said processor being enabled to identify optical characteristics of said DUT following imposing said delay of said DUT on said reference output signal and imposing said known delay on said test output signal.

9. The system of claim 8 wherein said processor includes a first differencing module and a second differencing module, wherein

said first differencing module has an input connected to receive said test output signal and has an output that is indicative of a difference in a phase of said test output signal as a function of time t and a phase of said test output signal as a function of time $t-\tau_{RI}$, where τ_{RI} is said known delay of said reference interferometer; and

said second differencing module has an input connected to receive said reference output signal and has an output that is indicative of a difference in a phase of said reference output signal as a function of said time t and a phase of said reference output signal as a function of time $t-\tau_{10}$, where τ_{10} is representative of a delay of said test interferometer following said optical coupling to said DUT.

10. The system of claim 9 wherein said processor further includes a third differencing module connected to said first and second differencing modules and configured to generate a noise-cancelled signal that is indicative of a time series of DUT analysis as the difference between said outputs of said first and second differencing modules.

11. The system of claim 10 wherein said processor includes a module for applying said time series to determine a group delay that is specific to said DUT.

12. The system of claim 8 wherein said source of coherent light is a tunable laser source.

13. A method of reducing phase noise in an interferometric system comprising the steps of:

continuously sweeping a laser light beam through a frequency range, said laser light beam including said phase noise;

splitting said laser light beam between a reference heterodyne interferometer having a known delay and a test heterodyne interferometer having a group delay of interest;

generating a time series of analysis signal on a basis of outputs of said reference and test heterodyne interferometers, including for each time t within said time series:

(a) determining a first difference between a phase of a test output of said test heterodyne interferometer at said time t and a phase of said test output at said time t offset by said known delay; and

(b) determining a second difference between a phase of a reference output of said reference heterodyne interferometer at said time t and a phase of said reference output at said time t offset by a delay representative of a delay of said test heterodyne interferometer; and

using said time series to reduce effects of said phase noise in calculations of said group delay of interest.

14. The method of claim 13 wherein said step of determining said second difference includes offsetting said time t by a mean of an estimation of said delay of said test heterodyne interferometer.

15. The method of claim 14 wherein generating said time series further includes determining a difference between said first and second differences for each said time t.

16. The method of claim 13 further comprising the step of coupling a device under test (DUT) to said test heterodyne interferometer, said group delay of interest representing delay being introduced by said DUT.

17. The method of claim 16 wherein coupling said DUT includes connecting a length of fiber optic cabling under test.

18. The method of claim 13 wherein said step of splitting said laser light beam includes dividing a first beam portion into separate arms of said test heterodyne interferometer and includes dividing a second beam portion into separate arms of said reference heterodyne interferometer.